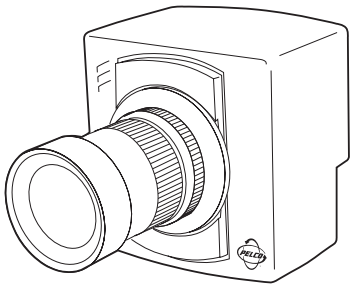

CCC4000 Series
CCD Color Camera

Installation/
Operation Manual

C1925M (3/99)

Pelco • 3500 Pelco Way • Clovis, CA 93612-5699 USA • www.pelco.com
In North America and Canada: Tel (800) 289-9100 or FAX (800) 289-9150
International Customers: Tel (1-559) 292-1981 or FAX (1-559) 348-1120

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IMPORTANT SAFEGUARDS AND WARNINGS

Prior to installation and use of this product, the following WARNINGS should be observed.

1. Installation and servicing should only be done by qualified service and installation personnel.

2. Installation shall be done in accordance with all local and national electrical and mechanical codes utilizing only approved materials.

3. Use only installation methods and materials capable of supporting four times the maximum specified load.

The product may bear the following marks:

This symbol indicates that dangerous voltage constituting a risk of electric shock is present within this unit.

CAUTION:
RISK OF ELECTRIC SHOCK. DO NOT OPEN.

This symbol indicates that there are important operating and maintenance instructions in the literature accompanying this unit.

Please thoroughly familiarize yourself with the information in this manual prior to installation and operation.

DESCRIPTION

The CCC4000 Series CCD color camera combines high resolution imaging with a very compact package. This camera features the following:

1/3-Inch Format Color CCD
This camera uses a 1/3-inch color CCD (charged coupled device) interline transfer sensing element.

Electronic/Passive Iris Control
Built-in, 4-pole iris drive connector allows this camera to be used with passive (DC controlled) auto-iris lenses. Video drive auto-iris lenses are not supported.

Lens Compatibility
The standard CS-mount and built-in DC iris control allows this camera to be used with a wide variety of lenses, including C/CS-mount lenses in the following styles: fixed iris, manual iris, or passive (DC controlled) auto-iris lenses. C-mount lenses require a C/CS-mount adapter. Video drive auto-iris lenses are not supported.

Automatic Gain Control
Automatically adjusts the image to compensate for changes in light levels when using fixed iris or manual iris lenses.

AC Line Lock
Automatically locks the camera to the AC frequency (60 Hz)–when using AC power sources–instead of the camera's internal clock frequency (59.94 Hz) to avoid picture roll during camera switching operations.

AC or DC Power Compatibility
This camera will automatically adjust to either AC or DC class 2 power supplies.

MODELS

CCC4000-2	NTSC format camera
CCC4000-2X	PAL format camera
CCC4001-2	Same as CCC4000-2, except electronic shutter disabled

LOCATION OF PARTS AND CONTROLS

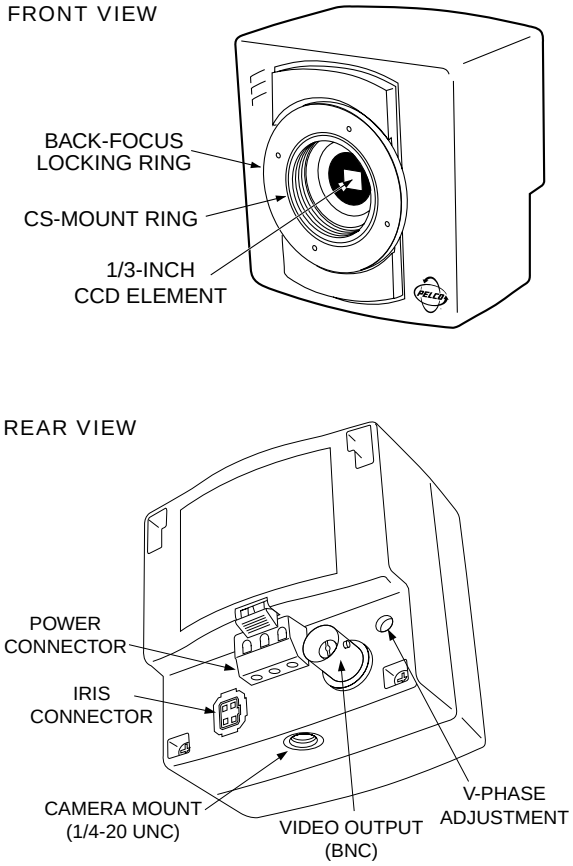

Figure 1. Location of Parts and Controls (Front and Rear)

INSTALLATION

CAMERA MOUNTING

CAUTION: Be careful not to damage the camera by screwing the adapter too far onto the threaded stud. As soon as the stud threads appear through the adapter captive nut, tighten the knurled nut.

Mount the camera using a 1/4–20 mounting screw that does not exceed .197" (4.5 mm ±.2 mm) in length (refer to Figure 2).

An optional CA1750 Mount Adapter is supplied to attach the camera to a ceiling mount.

To install the adapter (refer to Figure 3):

1. Place the camera inside the adapter and align the camera mount boss with the elongated hole in the adapter.
2. Attach the camera to the adapter with the provided 1/4-20 bolt and washers.
3. Attach the adapter with camera to the 1/4-20 threaded stud on the installed mount swivel head. Tighten the knurled nut on the mount against the adapter.

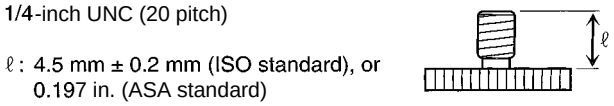

Figure 2. Camera Mounting Screw

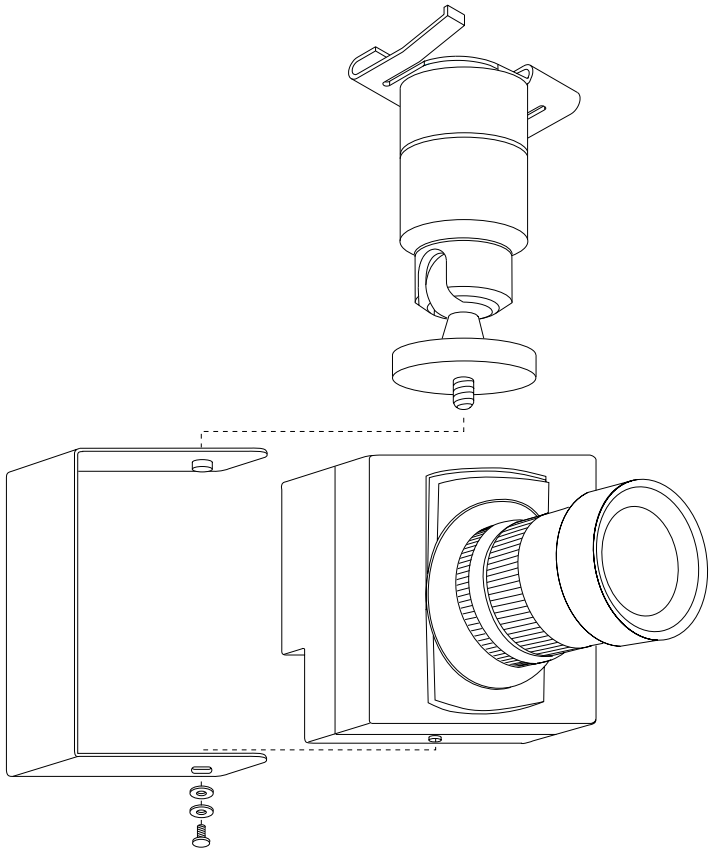

Figure 3. CA1750 Mount Adapter

POWER REQUIREMENTS

An external power supply (not provided) is required when using CCC4000 Series cameras. This camera will accept either AC or DC power in accordance with the chart immediately below. A safety ground terminal (⏚) is provided on the connector block to connect the camera to ground potential. Maximum voltage between the supply inputs and the safety ground must be less than 50 volts. Camera electronics are galvanically insulated from the camera supply, which protects a system with more than one camera from ground loop problems. The power connector block can be removed from the camera to ease mounting and/or installation.

Model	AC Power	DC Power
CCC4000-2, CCC4001-2	12–27.6 VAC @ 60 Hz	10.8–39 VDC (2.7 W)
CCC4000-2X	12–24 VAC @ 50 Hz	10.8–34 VDC (2.7 W)

POWER AND VIDEO CONNECTIONS

WARNING: Be sure to connect the power and ground leads to the appropriate terminals. Wrong connections may cause malfunction and/or damage to the video camera.

If you are using AC power and are wiring more than one camera to the same transformer, connect one side of the transformer to the same terminal on all cameras, and connect the other side of the transformer to the remaining terminal on all cameras. Failure to connect all of the cameras the same will cause the cameras to be out of phase with each other and may produce what appears to be vertical roll when switching between cameras.

Connect a video cable to the SIGNAL OUT connector (BNC) on the rear of the camera (refer to Figure 1). Refer to Table A for the type of video coaxial cable to use.

Table A. Video Coaxial Cable Requirements

Cable Type*	Maximum Distance
RG59/U	750 ft (229m)
RG6/U	1,000 ft (305m)
RG11/U	1,500 ft (457m)

* Minimum cable requirements:
75 ohms
All-copper center conductor
All-copper braided shield with 95% braid coverage

LENS INSTALLATION

GENERAL LENS INFORMATION

CCC4000 Series cameras are factory adjusted to the CS-mount standard. Fixed iris, manual iris, or passive (DC controlled) auto-iris lenses may be used. Passive (DC controlled) auto-iris lenses require a standard 4-pin square connector (type D4-152N, not supplied) that is standard on all Pelco lenses.

C-mount lenses are also compatible by using a Pelco PCMA40 C/CS-mount adapter. Refer to Figure 4.

Important Lens Notes:

Passive (DC controlled) auto-iris lenses are recommended in outdoor applications to control lighting changes and prevent picture smear.

This camera will not support active (video controlled) auto-iris lenses (having a built-in electronic circuit for driving the iris).

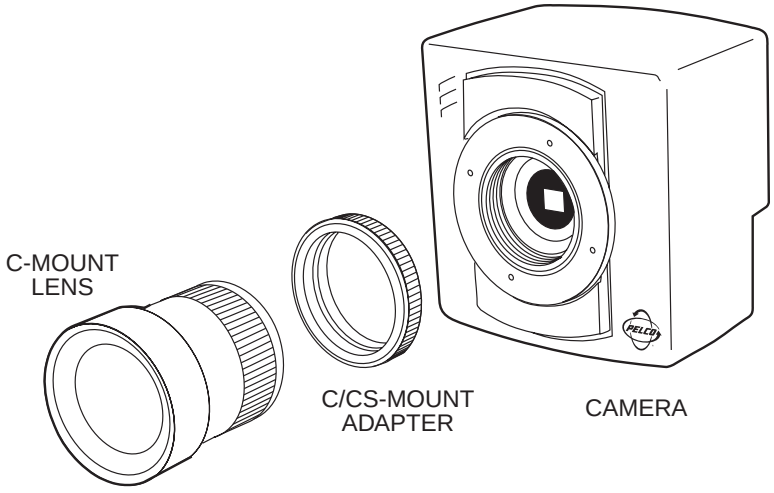

Figure 4. C-mount Lens with C/CS-Mount Adapter

LENS MOUNTING

Do not release the back-focus locking ring unnecessarily. Back-focus adjustment has been set at the factory to the standard CS-mount back-focus distance.

To mount a lens:

1. Remove the black protection cover from the CS-mounting ring.
2. If using a C-mount lens, mount a C/CS-mount adapter between lens and camera. Refer to Figure 4.
3. Screw the lens on the camera. Be careful to prevent dust from entering the space between the lens and the CCD element. If necessary, use clean, compressed air to remove any foreign matter.
4. When using a passive (DC controlled) auto-iris lens, connect the iris cable to the iris connector on the back of the camera. Refer to the *Auto-Iris Lenses* section.
5. Aim the camera and focus the lens to the object or area to be observed.
6. If a manual-iris lens is used, adjust the iris for the best picture quality. The largest aperture gives the best light sensitivity, the smallest aperture the greatest depth of field.

AUTO-IRIS LENSES

Passive auto-iris lenses are DC controlled via the 4-pin iris drive connector (type D4-152N) located on the back of the camera (refer to Figure 1). When an auto-iris lens is used the electronic shutter speed is fixed at 1/60th of a second for EIA-standard cameras or 1/50th of a second for CCIR-standard cameras. The electronic shutter speed feature does not apply to the CCC4001-2 model since this function has been disabled.

Pin connections for the iris drive connector are as follows (refer to Figure 1):

pin 1	control coil + (damping coil -)
pin 2	control coil - (damping coil +)
pin 3	drive coil +
pin 4	drive coil -

BACK-FOCUS ADJUSTMENT

NOTE: The iris cable of a (passive) auto-iris lens prevents the lens being rotated more than 180 degrees. In this case, disconnect the iris cable, rotate the lens a full turn, reconnect the iris cable and continue the adjustment.

NOTE: When adjusting back-focus with an auto-iris lens, the iris cable must be plugged into the iris drive connector; otherwise, the iris will not open.

Do not release the back-focus locking ring unnecessarily. Back-focus adjustment has been set at the factory to the standard CS-mount back-focus distance.

Back-focus is defined as the distance between the lens optics and the camera's CCD sensing element.

Accurate back-focus becomes most critical when tracking stationary objects with a motorized zoom lens. In rare cases, however, a camera that gives an unsharp picture using a particular lens may require back-focus adjustment.

Fixed Focal Length Lenses

1. With the camera operating, position the camera to view the intended object.
2. Set the focus ring, if present, to infinity (∞).
3. Set the lens iris to its widest usable opening. Use a neutral density filter with auto-iris lenses in outdoor or bright light settings to ensure maximum iris opening during back-focus adjustment. When a neutral density filter is not available, point the camera to a relatively dark area to obtain the greatest iris opening.
4. Adjust the back-focus.
   a. Turn the back-focus locking ring counterclockwise to loosen the CS-mount ring.

b. Adjust the lens and the CS-mount ring together until picture is sharpest.

c. Hold the lens and CS-mount ring in place and turn the back-focus locking ring clockwise to tighten.

Motorized Zoom Lenses

1. With the camera operating, position the camera to view an object at a distance not less than 45 feet (15 meters) away.

2. Using the camera controller, set the lens in the following manner:

   a. Zoom out as far as possible (zoom wide).

   b. Focus on the distant object (focus far).

   c. Open the iris as wide as possible (iris open). Use a neutral density filter with auto-iris lenses in outdoor or bright light settings to ensure maximum iris opening during back-focus adjustment. When a neutral density filter is not available, point the camera to a relatively dark area to obtain the greatest iris opening.

3. Adjust back-focus until the object is in sharpest focus.

   a. Turn the back-focus locking ring counterclockwise to loosen the CS-mount ring.

   b. Adjust the lens and the CS-mount ring together until picture is sharpest.

   c. Hold the lens and CS-mount ring in place and turn the back-focus locking ring clockwise to tighten.

4. Zoom in all the way on the distant object, then focus the lens for best picture.

5. Zoom out all the way while observing the focus on the monitor (known as “tracking”). If the image stays in focus throughout the entire zoom range, the back-focus is correct. Otherwise repeat the process beginning with step 1.

CAMERA SYNCHRONIZATION AND V-PHASE

When using a DC power supply, synchronization is internally locked and V-phase control is inoperative.

V-phase adjustment is unnecessary when using AC power with a single camera.

When powering more than one camera with AC, phase differences may occur as a result of being connected to different power groups. These phase differences become apparent as a brief rolling of the picture each time cameras are switched, known as vertical roll.

Vertical roll can be corrected by synchronizing the cameras using the V-phase control button inside the opening on the back of the camera (refer to Figure 1). Each time the V-phase button is pressed, the line lock position shifts by 60 degrees.

The CCC4000 Series cameras generate a video signal with synchronization pulses corresponding to the following:

CCC4000-2	NTSC Standard
CCC4000-2X	PAL Standard
CCC4001-2	NTSC Standard

V-PHASE ADJUSTMENT

Generally, it is necessary to have two people in communication when cameras are synchronized: one person at the camera to be synchronized and a person at the monitor to observe the vertical “roll” and the effect of any adjustments made at the camera.

1. Choose a camera to which all of the other cameras will be synchronized. Go through the available cameras and determine the best camera to which the others should be synchronized.

2. Select a second camera that is out of synchronization with the first camera.

3. To shift the V-phase, use a sharp pencil, a toothpick, or some other pointed device capable of being inserted into the V-phase adjustment opening. Each press of the V-phase button will shift the AC linelock by 60 degrees.

4. Switch the cameras back and forth, observing the “roll” between the cameras when they are switched.

5. If “roll” is present, press the V-phase button again, observing the “roll” each time an adjustment is made.

6. Repeat this process as many times as necessary and for each of the other cameras in the system.

TROUBLESHOOTING

The following conditions may be observed when using a CCD camera and are not necessarily a fault of the camera.

Vertical smear	This may occur when viewing a bright object or an intense reflection.
Patterned noise and blemish	A fixed pattern may appear over the entire monitor screen when the camera is operated at a high temperature.
Jagged picture	Becomes noticeable when viewing stripes, straight lines, or similar patterns.
Camera does not operate	There are no serviceable parts on CCC4000 Series cameras. If a camera fails to function properly, confirm that all necessary connections are in order and that lens adjustments are correct for the application.

MAINTENANCE

Be careful not to spill water or other liquids on the unit.

Avoid operating or storing the unit in the following locations:

Extremely hot or cold places. The operating temperature of CCC4000 Series cameras is 14° to 122°F (10° to 50°C).

Damp or dusty places

Where it may become exposed to rain

Locations subject to strong vibrations

Near generators of powerful electromagnetic radiation such as radio or television transmitters

Remove dust or dirt on the surface of the lens or optical filter with a blower.

Clean the body with a dry cloth. If it is very dirty, use a cloth dampened with a small quantity of neutral detergent, then wipe dry. Avoid the use of volatile solvents such as thinners, benzene, alcohol, and insecticides. They may damage the surface finish, or impair the operation of the cameras.

SPECIFICATIONS

CCD Sensor:	Color 1/3-inch interline transfer
Pixels	
NTSC:	512 H x 492 V
PAL:	512 H x 582 V
Sensing Area:	4.7 x 3.5 mm (3/16 x 1/8 in.)
Sync System:	Free running/line lock (when AC powered)
Horizontal Resolution:	400 TV lines
Lens Mount:	CS mount
Light Sensitivity:	3.5 lux (≥ 50 ire/-6 dB) at f/1.2
Electronic Shutter Speed (N/A for the CCC4001-2 model)	
NTSC:	1/60-1/50,000 sec
PAL:	1/50-1/50,000 sec
Signal to Noise Ratio:	> 50 dB
Gain Control:	Automatic
Power Requirements	
PAL:	12–24 VAC, 10.8–34 VDC
NTSC:	12–27.6 VAC, 10.8–39 VDC
Video Output:	CVBS, 1 Vp-p, 75 ohms
Lens Jack:	4-pin connector (type D4-152N)
Power Consumption (camera only):	2.7 watts maximum
Operating Temperature:	14° to 122°F (-10° to 50°C)
Humidity:	20–95% relative humidity
Construction:	Conductive-coated ABS
Mounting Threads:	1/4-20 UNC
Dimensions:	2.75 in. W x 2.88 in. H x 2.38 in. D (70 x 72.5 x 60 mm)
Weight (without lens):	0.45 lb (200g)

(Design and product specifications subject to change without notice.)

REGULATORY NOTICES

NOTE: This equipment has been tested and found to comply with the limits of a Class A digital device, pursuant to part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

PRODUCT WARRANTY AND RETURN INFORMATION

WARRANTY

Pelco will repair or replace, without charge, any merchandise proved defective in material or workmanship **for a period of one year** after the date of shipment.

Exceptions to this warranty are as noted below:

- Five years on FT/FR8000 Series fiber optic products.
- Three years on Genex® Series products (multiplexers, server, and keyboard).
- Three years on Camclosure® and fixed camera models, except the CC3701H-2, CC3701H-2X, CC3751H-2, CC3651H-2X, MC3651H-2, and MC3651H-2X camera models, which have a five-year warranty.
- Two years on standard motorized or fixed focal length lenses.
- Two years on Legacy®, CM6700/CM6800/CM9700 Series matrix, and DF5/DF8 Series fixed dome products.
- Two years on Spectra®, Esprit®, ExSite™, and PS20 scanners, including when used in continuous motion applications.
- Two years on Esprit® and WW5700 Series window wiper (excluding wiper blades).
- Eighteen months on DX Series digital video recorders, NVR300 Series network video recorders, and Endura™ Series distributed network-based video products.
- One year (except video heads) on video cassette recorders (VCRs). Video heads will be covered for a period of six months.
- Six months on all pan and tilts, scanners or preset lenses used in continuous motion applications (that is, preset scan, tour and auto scan modes).

Pelco will warrant all replacement parts and repairs for 90 days from the date of Pelco shipment. All goods requiring warranty repair shall be sent freight prepaid to Pelco, Clovis, California. Repairs made necessary by reason of misuse, alteration, normal wear, or accident are not covered under this warranty.

Pelco assumes no risk and shall be subject to no liability for damages or loss resulting from the specific use or application made of the Products. Pelco's liability for any claim, whether based on breach of contract, negligence, infringement of any rights of any party or product liability, relating to the Products shall not exceed the price paid by the Dealer to Pelco for such Products. In no event will Pelco be liable for any special, incidental or consequential damages (including loss of use, loss of profit and claims of third parties) however caused, whether by the negligence of Pelco or otherwise.

The above warranty provides the Dealer with specific legal rights. The Dealer may also have additional rights, which are subject to variation from state to state.

If a warranty repair is required, the Dealer must contact Pelco at (800) 289-9100 or (559) 292-1981 to obtain a Repair Authorization number (RA), and provide the following information:

1. Model and serial number
2. Date of shipment, P.O. number, Sales Order number, or Pelco invoice number
3. Details of the defect or problem

If there is a dispute regarding the warranty of a product which does not fall under the warranty conditions stated above, please include a written explanation with the product when returned.

Method of return shipment shall be the same or equal to the method by which the item was received by Pelco.

RETURNS

In order to expedite parts returned to the factory for repair or credit, please call the factory at (800) 289-9100 or (559) 292-1981 to obtain an authorization number (CA number if returned for credit, and RA number if returned for repair).

All merchandise returned for credit may be subject to a 20% restocking and refurbishing charge.

Goods returned for repair or credit should be clearly identified with the assigned CA or RA number and freight should be prepaid. Ship to the appropriate address below.

If you are located within the continental U.S., Alaska, Hawaii or Puerto Rico, send goods to:

Service Department
Pelco
3500 Pelco Way
Clovis, CA 93612-5699

If you are located outside the continental U.S., Alaska, Hawaii or Puerto Rico and are instructed to return goods to the USA, you may do one of the following:

If the goods are to be sent by a COURIER SERVICE, send the goods to:

Pelco
3500 Pelco Way
Clovis, CA 93612-5699 USA

If the goods are to be sent by a FREIGHT FORWARDER, send the goods to:

Pelco c/o Expeditors
473 Eccles Avenue
South San Francisco, CA 94080 USA
Phone: 650-737-1700
Fax: 650-737-0933

REVISION HISTORY

Manual #	Date	Comments
C1925M	1/98	Original version.
	3/99	Added CCC4001-2 model. Revised manual format.

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